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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/049,597	02/14/2002	Francis Mouyen	49316/280551	9713

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EXAMINER

THOMAS, COURTNEY D

ART UNIT PAPER NUMBER

2882

DATE MAILED: 06/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

A10

**Office Action Summary**

Application No.

10/049,597

Applicant(s)

MOUYEN, FRANCIS

Examiner

Courtney Thomas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 March 2003.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All   b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_                      6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION*****Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schulza-Ganzlin et al. (U.S. Patent 4,995,062) in view of Mouyen (U.S. Patent 5,382,798).

3.

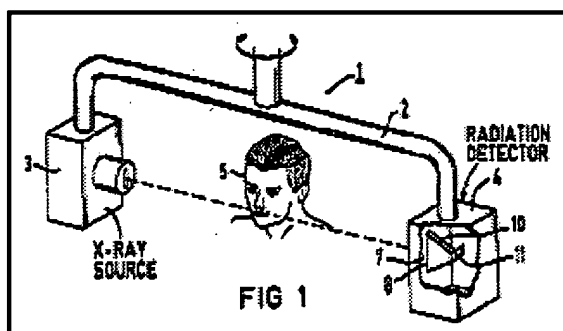


Figure 1 - U.S. Patent 4,995,062 to Schulza-Ganzlin et al.

4.

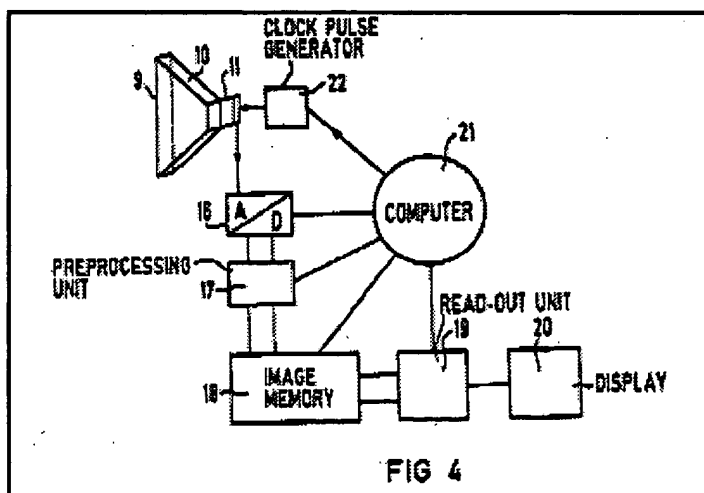
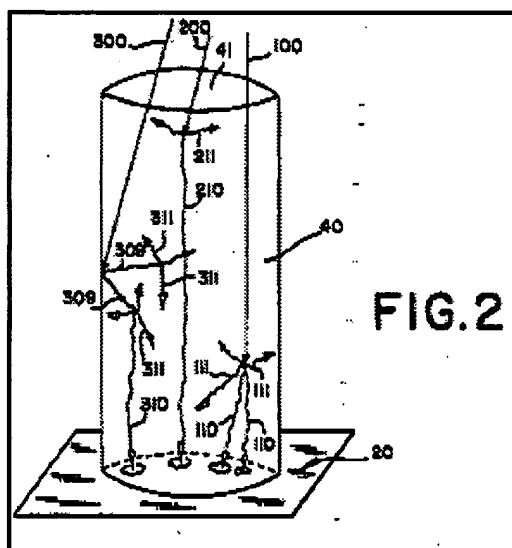
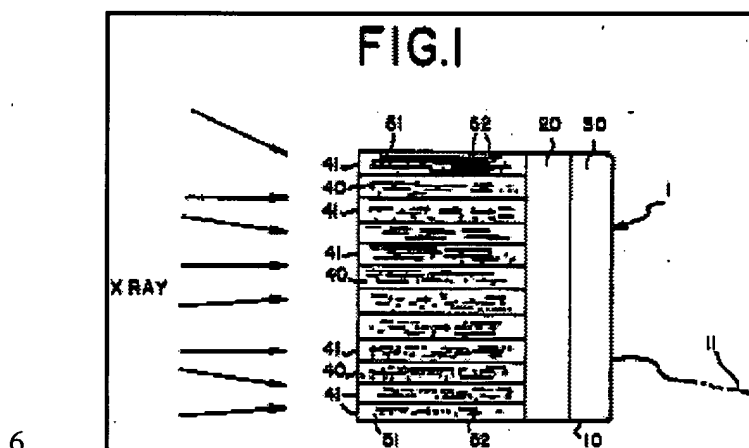


Figure 4 - U.S. Patent 4,995,062 to Schulza-Ganzlin et al.

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5. As per claim 1, Schulza-Ganzlin et al. disclose a method comprising the steps of emitting a bundle of X-rays in the direction of a tooth and its surrounding area and guiding the X-rays that emerge from the tooth and its surrounding area; transforming X-rays into light rays of a greater wavelength than that of X-rays (Fig. 2, #9; column 3, lines 5-6); converting these light rays into electrical signals and processing these signals to produce radiographic data (abstract). Schulza-Ganzlin et al. do not explicitly disclose the step of guiding emerging X-rays into substantially cylindrical rods substantially along the axis of the volume.



Figures 1 and 2 - U.S. Patent 5,382,798 to Mouyen

7. Mouyen discloses a method comprising the step of guiding emerging X-rays (200) into substantially cylindrical rods (40) substantially along the axis of the volume. Mouyen teaches that guiding emerging X-rays results in the formation of high quality pictures (column 1, lines 36-41).

8. It would have been obvious to modify the method of Schulza-Ganzlin et al. such that it incorporated the step of guiding emerging X-rays into substantially cylindrical rods substantially along the axis of the volume. One would have been motivated to make such a modification so that received radiation is used to form high quality pictures, by reducing diffuse radiation as taught by Mouyen (column 1, lines 36-41; column 3, lines 51-63).

9. As per claims 2, 8 and 9, Schulza-Ganzlin et al. as modified above, do not explicitly disclose a method (and apparatus) comprising the step of filtering electrical signals in dependence of pre-determined criteria.

10. It would have been obvious to further modify the method and apparatus of Schulza-Ganzlin et al. such that it incorporated the step of filtering electrical signals. One would have been motivated to make such a modification so that signals known to produce deleterious effects in image reproduction are removed prior to image formation, thereby ensuring the production of high quality imagery.

11. As per claim 3, Schulza-Ganzlin et al. as modified above, disclose a method comprising converting light rays into analogue signals and subsequently into digital electrical signals (Schulza-Ganzlin et al.; Fig. 4-16)

12. As per claims 4 and 10, Schulza-Ganzlin et al. as modified above, do not explicitly disclose a method (and apparatus) wherein a portion of the electrical signals is amplified according to a predetermined function.

13. It would have been obvious to further modify the method (and apparatus) of Schulza-Ganzlin et al. such that it incorporated the step of amplifying a portion of electrical signals according to a predetermined function. One would have been motivated to make such a modification so that signals bearing intensities of interest are systematically amplified for image reproduction, thereby resulting in images possessing sharp contrast and high quality.

14. As per claim 5, Schulza-Ganzlin et al. as modified above disclose an apparatus comprising a source (Schulza-Ganzlin et al.- 3); a plurality of cylindrical rods (Mouyen - 40) capable of transforming x-rays into light rays of wavelengths greater than x-rays; means (Schulza-Ganzlin et al.- 11) for converting light rays into electrical signals; means (Schulza-Ganzlin et al.- 10) for connecting cylindrical rods to means (11) and means for processing electrical signals (Schulza-Ganzlin et al.-16, 17, 18, 29, 20, 21).

15. As per claim 6, Schulza-Ganzlin et al. as modified above disclose an apparatus configured to convert light rays into analogue signals and a converter for converting analogue signals into digital signals (see Schulza-Ganzlin et al.; Fig. 4-16).

16. As per claim 7, Schulza-Ganzlin et al. as modified above disclose an apparatus comprising a CCD bar (see Schulza-Ganzlin et al.; Fig. 4-11) for converting light rays into analogue signals. Schulza-Ganzlin et al. do not explicitly disclose an apparatus comprising a CAN converter for converting analogue signals into digital signals.

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17. Schulza-Ganzlin et al. teach the use of a converter (16) for converting analogue signals to digital signals.

18. It would have been obvious to further modify the apparatus of Schulza-Ganzlin et al. such that it incorporated a CAN converter. One would have been motivated to make such a modification so that signals are converted to a form that facilitates easy transmission via a network and for easy storage and retrieval. Additionally, examiner notes that practitioners are aware of converters possessing specifications that provide optimal performances for intended applications; the selection of particular A/D converters would be at the discretion of a practitioner and well within the skill level of one in the art.

19. As per claim 11, Schulza-Ganzlin et al. as modified above disclose an apparatus comprising a temporary memory (18) and a converter (19) for converting electrical signals into video signals.

20. As per claim 12, Schulza-Ganzlin et al. as modified above, do not explicitly disclose an apparatus wherein the cylindrical rods are comprised of CsI (cesium iodide).

21. It would have been obvious to further modify the apparatus of Schulza-Ganzlin et al. such that it incorporated cylindrical rods comprised of CsI (cesium iodide). One would have been motivated to make such a modification so that incident radiation is converted to visible light, thereby enabling detecting elements to receive radiation possessing lower levels of intensity. Additionally, practitioners would recognize the use of CsI as a conventional scintillating material, and would thereby regard it an obvious design choice.

22. As per claim 13, Schulza-Ganzlin et al. as modified above, do not explicitly disclose an apparatus wherein the cylindrical rods have a length between 80 and 200  $\mu\text{m}$  for a diameter of between 3 and 7  $\mu\text{m}$ .

23. Mouyen teaches cylindrical rod configuration based on the attenuation needs of an application as well as the desired resolution characteristics (column 2, lines 53-68).

24. It would have been obvious to further modify the apparatus of Schulza-Ganzlin et al. such that it incorporated cylindrical rods having a length between 80 and 200  $\mu\text{m}$  for a diameter of between 3 and 7  $\mu\text{m}$ . One would have been motivated to make such a modification so that desired attenuation of incident radiation and resolution characteristics are achieved, as taught by Mouyen (column 2, lines 53-68).

25. As per claim 14, Schulza-Ganzlin et al. as modified above, disclose an apparatus wherein cylindrical rods are in contact with one another to form a mosaic (see Mouyen; Figs. 4 and 5).

26. As per claim 15, Schulza-Ganzlin et al. as modified above, do not explicitly disclose an apparatus wherein means for connecting outlet faces of cylindrical rods comprise bundle of optical fibers.

27. It would have been obvious to further modify the apparatus of Schulza-Ganzlin et al. such that it incorporated fiber optic bundles for connecting outlet faces of cylindrical rods. One would have been motivated to make such a modification so that outlet radiation is captured and channeled to respective receiving ends of sensing elements, thereby ensuring minimal signal transfer loss between cylindrical rods and sensing elements.



*Response to Arguments*

28. Applicant's arguments filed 03/28/03 have been fully considered but they are not persuasive. In particular, Schulza-Ganzlin et al. (U.S. Patent 4,995,062) disclose a method comprising the steps of emitting a bundle of X-rays in the direction of a tooth and its surrounding area and guiding the X-rays that emerge from the tooth and its surrounding area; transforming X-rays into light rays of a greater wavelength than that of X-rays ((9); column 3, lines 5-6); converting these light rays into electrical signals and processing these signals to produce radiographic data (abstract). Schulza-Ganzlin et al. do not explicitly disclose the step of guiding emerging X-rays into substantially cylindrical rods substantially along the axis of the volume.

29. In order to overcome this deficiency, Mouyen (U.S. Patent 5,382,798) is provided. Mouyen teaches a method comprising the step of guiding emerging X-rays (200) into substantially cylindrical rods (40) substantially along the axis of the volume. Mouyen teaches that guiding emerging X-rays results in the formation of high quality pictures (column 1, lines 36-41).

30. Applicant contests the application of the teachings of Mouyen to render an obvious modification to the apparatus of Schulza-Ganzlin et al. In particular, the traversal is based on two issues.

31. Applicant contends that the cited references teach away from each other. Applicant cites the disclosure of Schulza-Ganzlin et al. as relating to the use of a transmission or coupling element ((10)- see Fig. 1 above), such as fiber optics (column 3, lines 1-11). Applicant supports the position that the disclosures are divergent by also citing in Mouyen ('798) that the method

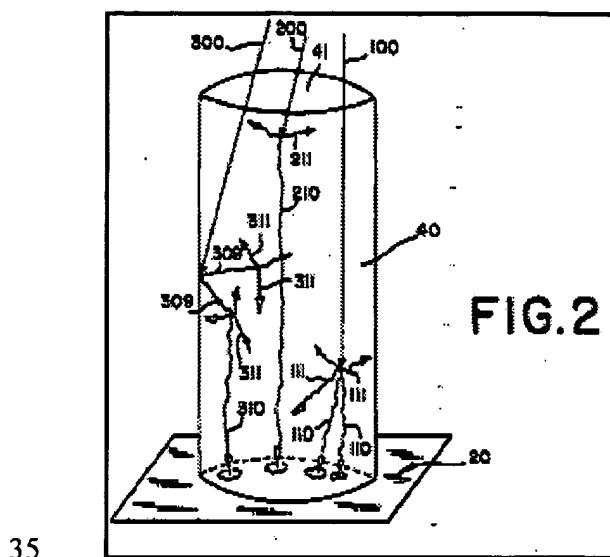
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(and apparatus) of the Mouyen system does not utilize optic fiber systems (column 1, lines 51-55).

32. Examiner notes however, that Schulza-Ganzlin et al. in describing the invention give an illustrative example of a transmitting or coupling element, of which fiber optics can be used. Examiner treats the disclosure of element (10) as not being limited only to fiber optics, but encompasses any elements that could satisfactorily provide/ possess a transmitting or coupling function (see also Schulza-Ganzlin et al. column 7, lines 54-59). Examiner further notes that the cylindrical rods of Mouyen possess transmitting/coupling capabilities. Therefore, examiner concludes that the coupling element of Mouyen may reasonably be applied to the method and apparatus of Schulza-Ganzlin et al. and the aforementioned references do not teach away from each other as they are in agreement with regards to transmitting/coupling elements.

33. Applicant additionally contends that the incorporation of the Mouyen element (40) within the method and apparatus of Schulza-Ganzlin et al. would render the invention of Schulza-Ganzlin et al. unsatisfactory for its intended purpose. In particular, Applicant cites that the construction of the Mouyen cylindrical rod (40) would severely limit the amount of visible light transmitted to the sensor (11) of Schulza-Ganzlin et al.

34. Examiner contends that the conclusion is partly true. However, upon further review of the Mouyen reference, Examiner has reached a differing opinion.



36. Figures 2 - U.S. Patent 5,382,798 to Mouyen

37. Mouyen ('798) – Fig. 2, teaches the interaction of radiation beams (100, 200 and 300) as they pass through an object of interest and traverse through cylindrical rod (40) and enter the face of a receiving sensor (20). It is noted that the Mouyen ('798) teaches that diffuse or secondary rays (200) or lateral primary rays (300) that enter cylindrical rod (40) do not (and will not) contribute significantly to the formation of an image as their energies are absorbed while traveling through the rod. However, Mouyen teaches that only primary rays (100) that enter rod (40) substantially along the rod's length-wise axis will contribute significantly to image generation (see Mouyen ('798) – column 3, lines 1-39).

38. Examiner contends that Applicant's conclusion is based only with regards to rays 200 and 300, and has failed to address the treatment of primary ray 100. Examiner further contends that in radiation imaging it is often the non-oblique beams that contribute to sharp image generation (i.e. less cross talk among detection elements, resulting in sharper image contrasts and higher image definitions).

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39. Based on the above analyses, Examiner concludes that Applicant's arguments relating to the divergent teachings of Schulza-Ganzlin et al. (U.S. Patent 4,995,062) and Mouyen (U.S. Patent 5,382,798) are not persuasive and further maintains the above rejection based on the addressing of arguments raised in Paper No. 6, received 3/28/03.

***Conclusion***

40. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Courtney Thomas whose telephone number is (703) 306-0473. The examiner can normally be reached on M - F (9 am - 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (703) 305 3492. The fax phone numbers for the


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organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0530.

Courtney Thomas

June 10, 2003

  
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